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State of Illinois
Department of Registration and Education
STATE GEOLOGICAL SURVEY DIVISION
John C. Frye, Chief

GUIDE LEAFLET

GEOLOGICAL SCIENCE FIELD TRIP

Sponsored by

ILLINOIS STATE GEOLOGICAL SURVEY

MORRIS AREA

GRUNDY COUNTY

MORRIS AND WILMINGTON QUADRANGLES



Leaders

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Urbana, Illinois
May 20, 1961

THE MORRIS GEOLOGICAL SCIENCE FIELD TRIP

ITINERARY

Suggestion: Have someone read the guide as we travel through the countryside so that the driver will be able to learn the geology of the area, also.

Abstract

The effects of Wisconsinan glaciation are especially striking in the Morris region. The area is situated in a topographic basin bordered by the Marseilles Moraine on the west and north and the Minooka Moraine on the east. A stop is made at an ice contact delta formed in glacial Lake Lisbon. This lake existed only in the northern part of the Morris Basin between the Marseilles Moraine and the Marseilles glacier. During later glacial history the basin was inundated by the Kankakee Flood. Lake Wauponsee was created at this time when meltwater impounded behind the Valparaiso Moraine was released. Area features produced by the Kankakee Flood, such as rubble bars, sand bars, and boulder concentrates, are discussed.

The youngest bedrock in the region is associated with the Illinois No. 2 Coal. Morris is underlain by this sequence of Pennsylvanian rocks and the area was once a significant coal producer. Southeast of Morris, shale overlying the No. 2 Coal contains plant fossils in great abundance. The trip includes a visit to the Mazon River plant fossil beds.

Only a few miles north of Morris, rocks of Ordovician age form the bedrock. A quarry producing the Galena Limestone and Dolomite and an outcrop of the Divine Limestone member of the Maquoketa Formation are visited. Both formations are very fossiliferous in this area.

0.0 0.0 Assemble in parking lot of Morris Community High School.

0.0 0.0 Turn left (north).

0.1 0.1 Note spoil banks of abandoned strip mine on left and straight ahead.

These mines are located along the outcrop line of the No. 2 Coal which extends in a general southwest-northeast direction in this area.


0.4 0.5 STOP. Highway 6. Turn right (east).

0.2 0.7 SLOW. Turn left (north).

0.3 1.0 Note the low ridge trending in a southwest-northeast direction ahead.

This is the beach ridge of glacial Lake Cryder.

- 0.2 1.2 Crest of the beach ridge of glacial lake Cryder. Note the extremely sandy nature of the soil on the right. In the afternoon we will stop for a discussion of Lake Cryder and its beach ridge.
- 0.3 1.5 Crossing interstate highway.
- 0.5 2.0 Note the extreme flatness of the topography in this region. This flatness is largely the result of lakes which covered the area several times during the Wisconsin stage of glaciation.
- 0.7 2.7 This relatively flat region is called the Morris Basin. It is a topographic basin rather than a structural basin located between the Minooka Moraine to the east and the Marseilles Moraine to the west. The crests of these moraines are noted on your topographic map.
- 0.9 3.6 Lower ridge trending east-west is possibly bedrock high. The bedrock is of Pennsylvanian Age.
- 0.2 3.8 Note abandoned coal mine on right.
- 0.2 4.0 During the recent drilling of a water well about 100 yards east of the road, Pennsylvanian coal was encountered at 63 feet and Ordovician limestone at 108 feet.
- 0.1 4.1 Crossroad.
- 1.2 5.3 Crossroad.
- 0.6 5.9 Note gravel pit in the distance. Note the low ridge which trends in a southwest-northeast direction.
- 0.6 6.5 Crossroad.
- 0.2 6.7 Crest of southwest-northeast trending delta composed of sand and gravel.



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0.3 7.0 STOP 1. Discussion of Ice Contact Delta Formed in Lake Lisbon.

Lake Lisbon is but one of several glacial lakes that occupied the Morris Basin during the Wisconsinan Glacial Stage. Lake Lisbon was formed between the Marseilles Moraine to the west and the front of the Marseilles Glacier as it retreated across the Morris Basin. At this time the Marseilles glacial retreat was irregular. It retreated back from the moraine in the northwest portion of the basin, while it still extended up the back slope of the moraine in the vicinity of the Illinois River. Thus, meltwater was ponded between the ice front and the high moraine. The outlet for the waters of Lake Lisbon was through sub-glacial channels across the moraine near the boundary of La Salle, Grundy and Kendall Counties and near Yorkville.

The maximum elevation of Lake Lisbon was between 700 and 710 feet. For at least part of Lake Lisbon's duration, the front of the Marseilles Glacier extended northeast-southwest at the position of this ridge. Drainage into the lake built a long delta of poorly sorted angular pebbly and cobbly gravel which makes up the ridge, its iceward face being generally steeper. When the delta was built, Lake Lisbon was about 15 miles long and 3 to 5 miles wide.

Lake Lisbon contains few distinctive shore-line features, probably because its level was fluctuated by variable volumes of water and continuous erosion of the outlets.

When the Marseilles Ice Front had further retreated a short distance southeast from the delta, it uncovered an area behind the moraine sufficiently low that Lake Lisbon drained southwestward into Lake Illinois, which existed west of the Marseilles Moraine in the Illinois Valley. Lake Illinois was created as a result of ponding behind the Bloomington Moraine.

At the time of the Kankakee Flood the Morris Basin was inundated by Lake Wauponsee and, at a somewhat later time, by Lake Morris. When Lake Chicago was drained, a lacustral river, called Lake Crider, was created in the Illinois Valley area.

During the next several stops, more history on the numerous lakes which have occurred in this area will be given.

0.5 7.5 T-road east.

0.6 8.1 T-road west.

0.5 8.6 Crossroad.

0.2 8.8 SLOW, entering town of Lisbon.

0.3 9.1 STOP. Turn right (east).

1.4 10.5 Bedrock of Ordovician Age occurs at a very shallow depth in this area.

1.2 11.7 STOP. Turn right on gravel road to Central Quarry.

0.3 12.0 STOP 2. Central Stone Company Quarry. (DO NOT BLOCK ACCESS ROADS TO THE QUARRY.)

This quarry produces from rocks of Ordovician age. The stone is quarried for road materials, agricultural lime, for mixing with concrete, and for construction and miscellaneous purposes.

The Illinois State Geological Survey completed detailed work on this quarry in 1956. The section at that time was as follows:

Wisconsin	Till	1-4'
Galena	Limestone, light gray to gray, fine to medium-grained, fossiliferous. Light brown mottling probably dolomite. Numerous reddish brown shale partings and calcite nests.	38'
Galena-Plattville	Dolomite, medium-grained, sandy texture, light gray mottled dark gray with greenish brown shale partings. Only 3' exposed in 1956, more has been exposed since.	3'+

We are near the southern limit of the Ordovician outcrop area which covers most of the northern portion of Illinois. To the south of this quarry, Pennsylvanian rocks overlie the Ordovician rocks unconformably. The time interval represented by the missing Silurian, Devonian, and Mississippian rocks amounts to about 150 million years.

Some beds in this quarry are very fossiliferous. The best collecting area is in the old part of the quarry along the southeast wall.

- 0.2 12.2 SLOW. Turn left.
- 0.5 12.7 STOP. Highway 47. Turn right (south).
- 1.0 13.7 The Minooka moraine can be seen on the horizon to the east.
- 4.2 17.9 Saratoga School on right.
- 0.7 18.6 Bridge over Interstate Highway 83.
- 0.4 19.0 Crossing Cryder Lake shoreline.
- 0.4 19.4 Entering Morris.
- 0.4 19.8 SLOW. Turn right on Highway 6.
- 0.5 20.3 SLOW. Turn left, (south) on road to high school.
- 0.6 20.9 STOP 3. Lunch. Turn left into Morris City Park.

- 0.1 21.0 Turn right.
- 0.1 21.1 Pennsylvanian shale outcropping in stream bank in park.
- 0.1 21.2 STOP. Turn right, leaving Morris City Park.
- 0.1 21.3 Turn left.
- 0.1 21.4 Turn right on Wauponsee Street. EXTREME CAUTION, railroad.
- 0.1 21.5 Turn left on West Bedden Street, east.
- 0.0 21.5 STOP. Continue straight ahead, crossing Liberty Street.
- 0.1 21.6 STOP. Division Street, turn right on Highway 47.
- 0.1 21.7 TRAFFIC LIGHT. Obey signal.
- 0.3 22.0 TRAFFIC LIGHT. Obey signal. Continue ahead.
- 0.1 22.1 Illinois - Michigan canal.
- 0.1 22.2 Crossing the Illinois River.
- 0.8 23.0 SLOW. Turn left on gravel road.
- 0.2 23.2 Low ridge on right is shoreline marked by meltwater when glacial Lake Chicago was drained. Note the gravel pit in the side of this terrace.
- 0.5 23.7 Mazon River on left. Note the numerous meanders on your map as this stream approaches the Illinois River.
- 0.4 24.1 SLOW. Turn right on gravel road.
- 0.1 24.2 Notice large white pine trees in this vicinity.
- 0.4 24.6 SLOW. CAUTION, crossroad.
- 0.4 25.0 STOP 4. Beach ridge of glacial Lake Cryder.
- Sand, grading up to fine pebbly sand. Note the mound shape of the beach ridge.

This beach consists of a steep slope 20-25 feet high which extends for about 13 miles along the north side of the Illinois River and is present on the south side in the Morris area. The beach is generally underlain by till, but in the Morris area a little gravel is locally present along the slope and in a low ridge 1-3 feet high at the top of the slope. Boulders are common on the surface, especially near the base of the steep slope.

Cryder Lake, one of the last glacial lakes, is only one of the many that existed in this region at various times during the Wisconsin

stage of glaciation. The sequence of events is an interesting chapter in the geologic history of the area. Let us start with the advance of the Marseilles Ice Sheet approximately 16,000 years ago. Material dumped by the ice formed the Marseilles end moraine which now forms the western wall of the Morris Basin. (Moraines formed when an ice front remained stationary because the melting exactly matched its advance, producing a sort of treadmill which carried tons of material to the edge where it was dumped off.) As the ice gradually melted back from the moraine, the meltwater was trapped between the ice and the moraine forming glacial Lake Lisbon. The ice front must have extended in a northeast-southwest direction across the Morris Basin, because an ice contact delta, trending in this direction, formed in Lake Lisbon. We saw this delta at Stop 1. The Marseilles ice eventually retreated back so far that Lake Lisbon drained southeastward into Lake Illinois.

The next advance of the Wisconsinan Glacier is marked at its maximum extent by the Minooka Moraine. The Minooka, which we will see later in the afternoon, forms the eastern wall of the Morris Basin. Following the Minooka were the Rockdale and Lemont advances which contributed little to the present features of the Morris area.

The coming of the Valparaiso Glacier about 15,000 years ago marked the next significant stage in this sequence. Water that backed up behind the Valparaiso Moraine, supplemented by water from the DuPage and DesPlaines Valleys, accumulated in such tremendous quantities that all of it could not escape along the Illinois Valley through the Marseilles Moraine and consequently flooded the Morris Basin forming glacial Lake Wauponsee. Lake Wauponsee attained a maximum height of 650 feet above sea level. Several other lakes were formed at about this time to the south and southeast. The great flooding of the land is called the Kankakee Flood because the significance and effects (rubble bars, limestone slabs, etc., carried by the currents) of this great release of water was first recognized in the vicinity of Kankakee. The major current of the Kankakee Flood was along the Kankakee River, but currents from the DesPlaines and DuPage Valleys eroded a wide gap in the Minooka Moraine.

Lake Wauponsee drained and eroded a channel through the Marseilles Moraine until it reached bedrock at an elevation of 560 feet. Water backing up behind the bedrock barrier formed Lake Morris. The level of Lake Morris was not maintained long (as evidenced by the restricted presence of benches at the 560 foot level) because the soft sandstone and sandy shale were eroded to about 540 feet allowing the lake to drain.

The Tinley Moraine formed on the back slope of the Valparaiso Moraine about 14,000 years ago and initiated a series of events which leads to the present day. The Lake Border moraines date as recently as 12,500 years ago, and the gradual transformation of Lake Chicago into Lake Michigan completes the story.

Lake Chicago time marks the waning of the Pleistocene Epoch. Water ponded behind the Tinley Moraine formed Glacial Lake Chicago. The extent and level of this lake fluctuated repeatedly due to periodic

advances and retreats of the ice front and to continual opening and closing of outlet channels. The major drainage of Lake Chicago is called the Outlet River. It flowed through the Tinely and Valparaiso moraines along the DesPlaines Valley and into the Illinois River. Some of the outlet levels of Lake Chicago are preserved in the Morris region. The most prominent of these is called Cryder Lake. Cryder Lake formed when the low unconsolidated walls along the Illinois River were eroded away forming a lacustral river, that is, a Lake formed by the widening of a river. The Cryder Lake shoreline at an elevation of 545-550 feet is the most continuous shoreline in the Morris Basin and is thought to mark the highest level of the outlet waters of Lake Chicago in the Basin. It is a distinct erosional and depositional escarpment 20-25 feet above a surface largely eroded on much older glacial deposits or on bedrock.

0.4 25.4 SLOW. Turn left (east).

0.6 26.0 The region behind the Lake Cryder beach ridge was once occupied by Lake Wauponsee and Lake Morris. The topography in this area is very typical of a lake bed.

0.4 26.4 T-road. Turn right (south).

0.2 26.6 T-road east. Continue ahead.

0.6 27.2 SLOW. Turn left (east) on blacktop road.

0.8 28.0 SLOW. Turn right (south).

0.2 28.2 SLOW. Turn left (east). Mazon River on right.

0.2 28.4 SLOW. Turn right over bridge across Mazon River. Note outcrops of Pennsylvanian sandstone on left in stream bed.

0.2 28.6 Note the numerous large erratic boulders in the pasture on the right. This is very near the beach ridge of Lake Cryder.

Imprints of the Kankakee Flood are abundant adjacent to the Kankakee River in the form of large boulders, limestone slabs and linear rubble bars. These features were formed when glacial meltwater trapped behind the Valparaiso Moraine was suddenly released down the course of the present Kankakee River.

Because the Illinois River channel was constricted through the Marseilles Moraine, the waters from this flood were not able to escape rapidly enough and backed up between the various moraines in the area creating several sizeable glacial lakes. These lakes are shown on the accompanying diagram of the Glacial Geology of Northeast Illinois.

The boulders, limestone slabs, and rubble bars give some indication of the currents involved in this flood.

- 0.1 28.7 Turn left (east).
0.3 29.0 Note outcrop of Pennsylvanian sandstone in Mazon River on the left.
0.5 29.5 Pennsylvanian shale exposed in the ditch on the left.
0.2 29.7 T-road south, continue straight ahead.
0.0 29.7 Pennsylvanian sandstone and shale exposed in ditch on left.
0.3 30.0 STOP 5. Mazon River Section of Pennsylvanian Strata Overlying the No. 2 Coal Horizon.

The Mazon River plant fossil beds are known around the world. Museums in almost every country have fossils on display from this locality, and scientists from many foreign countries come to America to examine and study these fossils and their occurrence each year.

From these outcrops along Mazon River most of the original type specimens were collected. Specimens from this and other outcrops in this vicinity had received intensive study long before strip mining exposed many additional fossils.

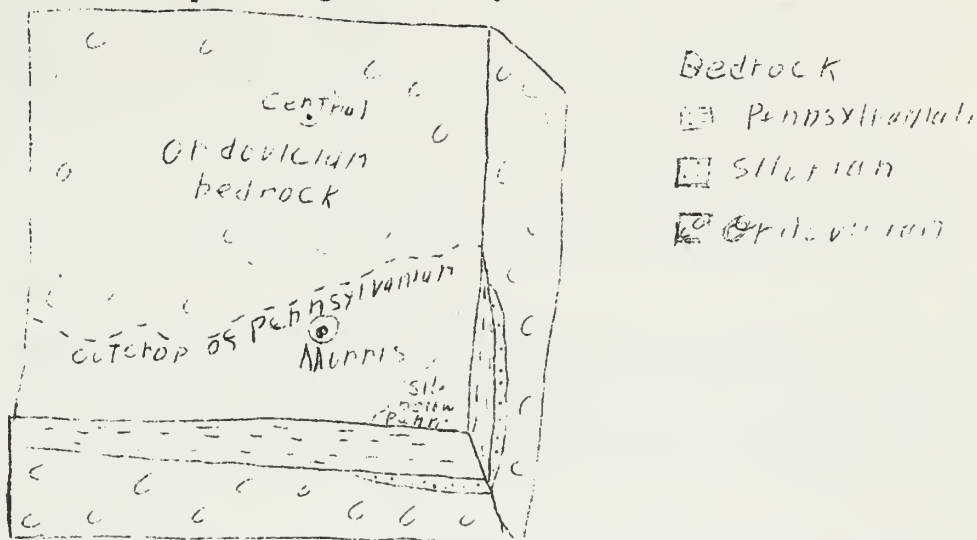
In the Morris and Wilmington areas the Pennsylvanian rock sequence can be divided into two parts: clay and shale strata below the No. 2 Coal; and shale, sandy shale, and sandstone above the No. 2 Coal. The gray shale overlying the No. 2 Coal is called the Francis Creek which contains the concretions that are most productive in terms of plant fossils. In this particular area a sandy shale is very conspicuous in the river bank and in the high wall of the strip mine. This shale also contains numerous concretions, but few fossils.



Perhaps during the course of our trip, you have noticed that bed-rock exposures have either been of Ordovician or Pennsylvanian age. In the southern portion of Illinois there are rocks of Silurian, Devonian, and Mississippian age occurring between the Ordovician and Pennsylvanian Systems. Why aren't these rocks present in the Morris and Wilmington areas? Most geologists agree that the Silurian, Devonian, and at least part of the Mississippian sequence of rocks were deposited in this area.

However, before No. 2 Coal was deposited the region was uplifted and the intervening rocks completely removed by erosion. It is probable that the uplifting and erosion occurred during the upper portion of the Mississippian and early part of the Pennsylvanian Period.

This relationship is diagrammatically illustrated below:



- 0.2 30.2 The area for several miles to the north has been strip mined. The plant fossil collecting in this area is not very good, mainly because the overlying shale was sandy rather than clayey as is true farther east.
- 0.3 30.5 There are numerous concretions on the strip piles to the left, but upon close examination these are mostly sandy and non-fossiliferous.
- 0.3 30.8 SLOW. Turn left (north).
- 1.9 32.7 One of the possible uses for strip mine spoil areas is recreation. This area is being utilized to a great extent for recreation.
- 0.7 33.4 STOP. Continue ahead.
- 0.5 33.9 Note the large boulders farmers have piled along the fence. This is also a part of the Kankakee Flood area.
- 0.7 34.6 Dresden Nuclear Power Station on far right.
- 0.3 34.9 Lower ridge of glacial Lake Chicago.
- 0.6 35.5 Long linear ridges in this area might perhaps be rubble bars from the Kankakee Flood.
- 0.4 35.9 SLOW. Turn right. Illinois River on the left.
- 0.8 36.7 Note numerous boulders and boulder concentration in low ridge on right. This is a rubble bar.

0.4 37.1 There are numerous boulders and rubble bars in this region.

0.4 37.5 CAUTION. Railroad crossing.

STOP 6. Outcrop of the Divine member of the Maquoketa Shale.

The Divine Limestone is a member of the Maquoketa Formation which in this area consists of shale and limestone. The Maquoketa Formation occurs at the top of the Ordovician System and lies on top of the Galena Limestone and Dolomite Formation seen this morning at Stop 2.

The Divine member is 70 feet thick in some places. The upper part is usually white, light gray or buff, locally pink or brown limestone which grades downward to gray to dark gray, fine to medium to coarse-grained dolomite.

The limestone offers some possibilities for quarrying. Its distribution and thickness has been studied by Survey geologists and reported in Illinois State Geological Survey Circular 230, "Subsurface Dolomite and Limestone Resources of Grundy and Kendall Counties," 1957. This report is available upon request from the Geological Survey at Urbana free of charge.

The Divine Limestone member is a very fossiliferous unit. Crinoids, Bryozoans, Brachiopods, and Trilobites are represented.

0.2 37.7 Bedrock high. The rock is exposed in the ditch along the road.

0.3 38.0 Road to Dresden Island Lock and Dam. Continue ahead.

0.2 38.2 The stone fence on the right is built of blocks of limestone out of the Maquoketa Formation, picked up out of the fields in this area. The Divine member lies very close to the surface throughout this area.

0.2 38.4 Again note the boulder concentration.

0.4 38.8 Note the end of the Minooka Moraine that has been sheared off by the Kankakee and Des Plaines Rivers here where they join to form the Illinois. South of the river the Minooka Moraine has been entirely removed by the Kankakee Flood.

0.1 38.9 Kankakee River straight ahead.

0.2 39.1 SLOW. Turn right (south). Dresden Nuclear Power Station on left.

0.7 39.8 Note the gravelly nature of the outwash material in this area.

0.3 40.1 Note numerous boulders strewn across the surface on left.

0.3 40.4 Note the boulder farm on the left.

- 0.2 40.6 Illinois Clay Products Company, Goose Lake Clay Operation on right.
The Illinois Clay Products Company produces a type of clay marketed under the name of grundite. It is used extensively in the steel industry as a mortar to line fire bricks. It is an unusual type of clay that expands slightly when it is fired, sealing the inside of the iron furnaces.
- 0.6 41.2 Note strip mine spoil piles being leveled on left. This is undoubtedly being developed as a recreational area.
- 0.5 41.7 STOP. Turn left on road to Lorenzo (east).
- 1.0 42.7 Large abandoned strip mine of the Northern Illinois Coal Company on right.
- 1.6 44.3 SLOW. Entering Lorenzo.
- 0.1 44.4 SLOW. Railroad crossing. Two sets of tracks.
- 0.3 44.7 SLOW. Turn right (south).
- 1.4 46.1 Sandbars on right and left probably existed in glacial Lake Cryder.
- 0.1 46.2 Crossroad. Continue ahead.
- 0.6 46.8 Note the large erratics in this area.
- 0.8 47.6 Turn right into Greer Technical Institute property.

We will have to drive some distance into the strip mine area for our collecting.

STOP 7. Anywhere along the area where you have parked should be satisfactory for the collection of plant fossils. The plant fossils are in brown ironstone concretions. The procedure is to turn them on edge, split them open and hope that you have a good fossil. The fossils that you can find range from plant fossils of very ordinary design to seed cones, fishes, spiders, crustaceans, trilobites. True, most of the specimens which you find are plant fossils, but the others are sufficiently numerous to make it worthwhile to try to collect them.

The rocks of the Coal Measures or the Pennsylvanian System cover some 35,000 square miles in the state. One of the unusual features of the Pennsylvanian rocks is that at many places they overlap the underlying formations which range in age from Mississippian to at least Ordovician.

The McCormick group of the Pennsylvanian System is composed primarily of sandstones, underclays, thin coals, and silty shales;

whereas, the Kewanee and McLeansboro groups are subdivided in a fashion which has been idealized to contain ten members called a cyclothem. The members of a cyclothem go in this fashion from the bottom to top: sandstone, shale limestone, underclay, coal, shale, limestone, shale, limestone and shale. In only a few instances does one find a cyclothem to be complete in itself. Normally, there are only seven members or less present. It has been visualized by Pennsylvanian stratigraphers or theorists that much of eastern North America was a vast inland swamp during the Pennsylvanian Period. At times when the water levels were particularly critical, only a few inches of change in levels could cause the difference in the deposition of siltstones, sands, underclays, coaly materials, or limestones.

The No. 2 Coal is near the base of the Pennsylvanian in this region, though in southern Illinois in many instances there are 1200 feet of intervening sediments. The underclay beneath the No. 2 Coal is used extensively as a source of ceramic material. Deposits of Goose Lake clays, a short distance to the west, have been used by the Illinois Clay Products Company for many years in the manufacture of ceramic materials, especially fire brick which are used in the iron and steel industry. The No. 2 Coal is the most extensive coal in the state, covering virtually all of the 35,000 square miles of coal-bearing rocks. Although the coal is never very thick, seldom exceeding five feet and more often between two and three feet thick, the reserves of this coal are extensive. Gentle folding associated with the formation of the LaSalle Anticline has brought the No. 2 Coal at or near the surface here. As a result many square miles of this coal have been mined by stripping methods, leaving vast amounts of the overlying gray shale in the long sinuous spoil heaps which you see. Within this shale are brown ironstone concretions which were originally siderite or iron carbonate, but, through processes of weathering, their exterior has been altered to a hydrated iron oxide commonly called limonite. Within these concretions are often found impressions such as stems of the fossil plants which grew during Pennsylvanian time, some 200 or more million years ago. Often leaves of various sorts are preserved, and more rarely the fruiting bodies are found. Rarely, we find such things as fossil spiders, fossil worms, fishes and horseshoe crabs.

Much of the stripped over ground has been closed to the general public. I ask your particular indulgence today to take care that we will be welcome to return to this fossil collecting spot again.

For references to be used in identifying plant fossils, I suggest the following: Educational Series No. 6, "Field Guide--Pennsylvanian Plant Fossils," published by the Illinois State Geological Survey; "The Wilmington Flora," by George Langford, published by the Earth Science Club of Northern Illinois; and Illinois State Geological Survey Bulletin 52, "Pennsylvanian Flora in Illinois." Unfortunately, Bulletin 52 is out of print. I suggest that you obtain a copy from your public library.

Suggested References for Further Study of the Geology of the Field Trip Area

1. Illinois State Geological Survey, Bulletin 43C, Geology and Mineral Resources of the Morris Quadrangle.
2. Illinois State Geological Survey, Bulletin 66, Geology and Mineral Resources of the Marseilles, Ottawa, and Streator Quadrangles.
3. Field Conference Guidebook, Illinois and Indiana Geological Surveys, "Basis of Subdivision of Wisconsinan Glacial Stage in Northeastern Illinois," 1953.
4. Illinois State Geological Survey, Bulletin 52, Pennsylvanian Flora (Mazon Creek). Out of print.

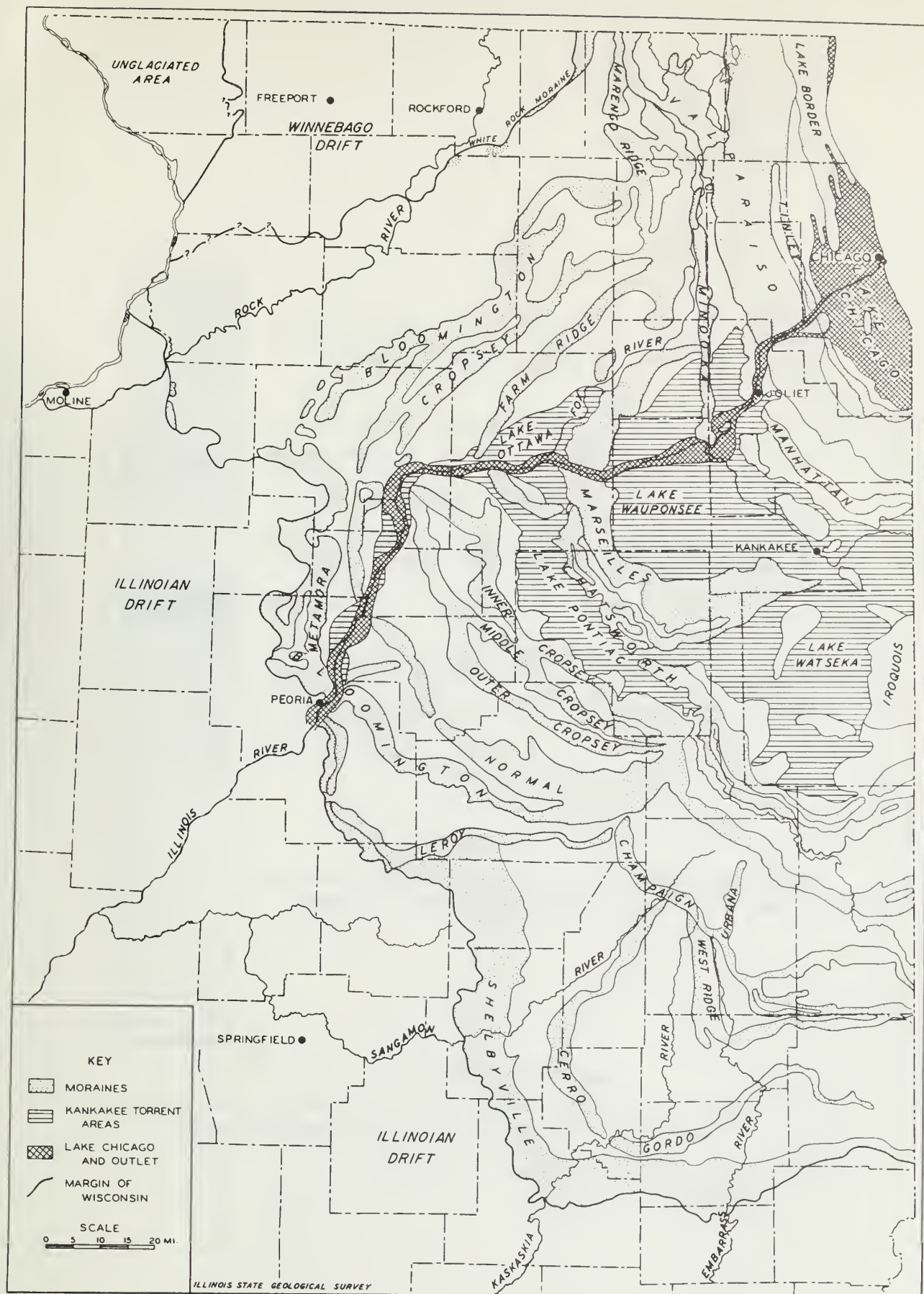
GEOLOGICAL COLUMN - MORRIS AREA

ERAS		PERIODS	EPOCHS	REMARKS
Cenozoic "Recent Life"	Age of Mammals	Quaternary	Pleistocene	Recent post-glacial stage Wisconsin drifts
		Tertiary	Pliocene Miocene Oligocene Eocene Paleocene	Not present in Morris area
Mesozoic "Middle Life"	Age of Reptiles	Cretaceous		Not present in Morris area
		Jurassic		Not present in Illinois
		Triassic		Not present in Illinois
Paleozoic "Ancient Life"	Age of Amphibians and Early Plants	Permian		Not present in Illinois
		Pennsylvanian	(McLeansboro Group)	Not present in Morris area
			(Kewanee Group)	Present only in Essex area
			(McCormick Group)	Shale, coal, underclay, sandstone, siltstone - in sinks
		Mississippian	Chester (Upper Mississippian)	Not present in Morris area
			Valmeyer and Kinderhookian (Lower Mississippian)	Not present in Morris area
	Age of Fishes	Devonian		Not present in Wilmington-Morris area
	Age of Invertebrates	Silurian		Dolomite, present near Wilmington
		Ordovician		Shale, limestone, and sandstone
		Cambrian		Shale, limestone, and sandstone
Proterozoic Archeozoic "Early Life"		Referred to as "Pre-Cambrian" Time		Metamorphic and cyrstalline rocks



Time Table of Pleistocene Glaciation
(after M. M. Leighton and H. B. Willman, 1950, J. C. Frye and H. B. Willman, 1960)

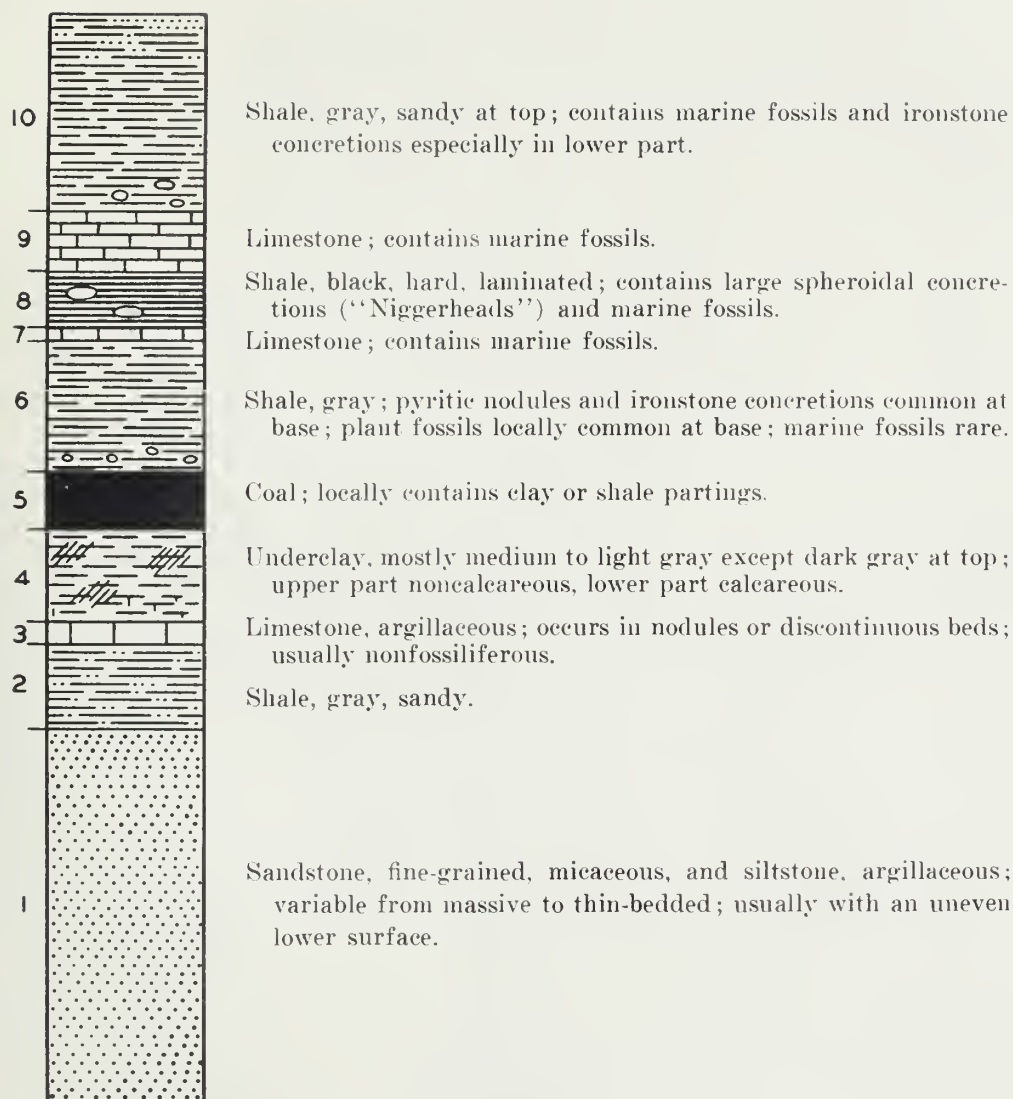
Stage	Substage	Nature of Deposits	Special features
Recent		Soil, youthful profile of weathering, lake and river deposits, dunes, peat	
Wisconsinan	5,000 yrs.		
	Valderan	Outwash	Glaciation in northern Illinois
	11,000 yrs.		
	Twocreekan	Peat, alluvium	Ice withdrawal, erosion
	12,500 yrs.		
	Woodfordian	Drift, loess, dunes lake deposits	Glaciation, building of many moraines as far south as Shelbyville, extensive valley trains, outwash plains, and lakes
	22,000 yrs.		
Sangamonian (3rd interglacial)	Farmdalian	Soil, silt and peat	Ice withdrawal, weathering, and erosion
	28,000 yrs.		
	Altonian	Drift, loess	Glaciation in northern Illinois, valley trains along major rivers, Winnebago drift
	50,000 to 70,000 yrs.		
Illinoian (3rd Glacial)	Buffalohartan	Drift	
	Jacksonvillian	Drift	
	Paysonian (terminal)	Drift	
	Lovelandian (Pro-Illinoian)	Loess (in advance of glaciation)	
Yarmouthian (2nd interglacial)		Soil, mature profile of weathering, alluvium, peat	
Kansan (2nd glacial)		Drift Loess	
Aftonian (1st interglacial)		Soil, mature profile of weathering, alluvium, peat	
Nebraskan (1st glacial)		Drift	



GLACIAL MAP OF NORTHEASTERN ILLINOIS

GEORGE E. EKBLAW

Revised 1960

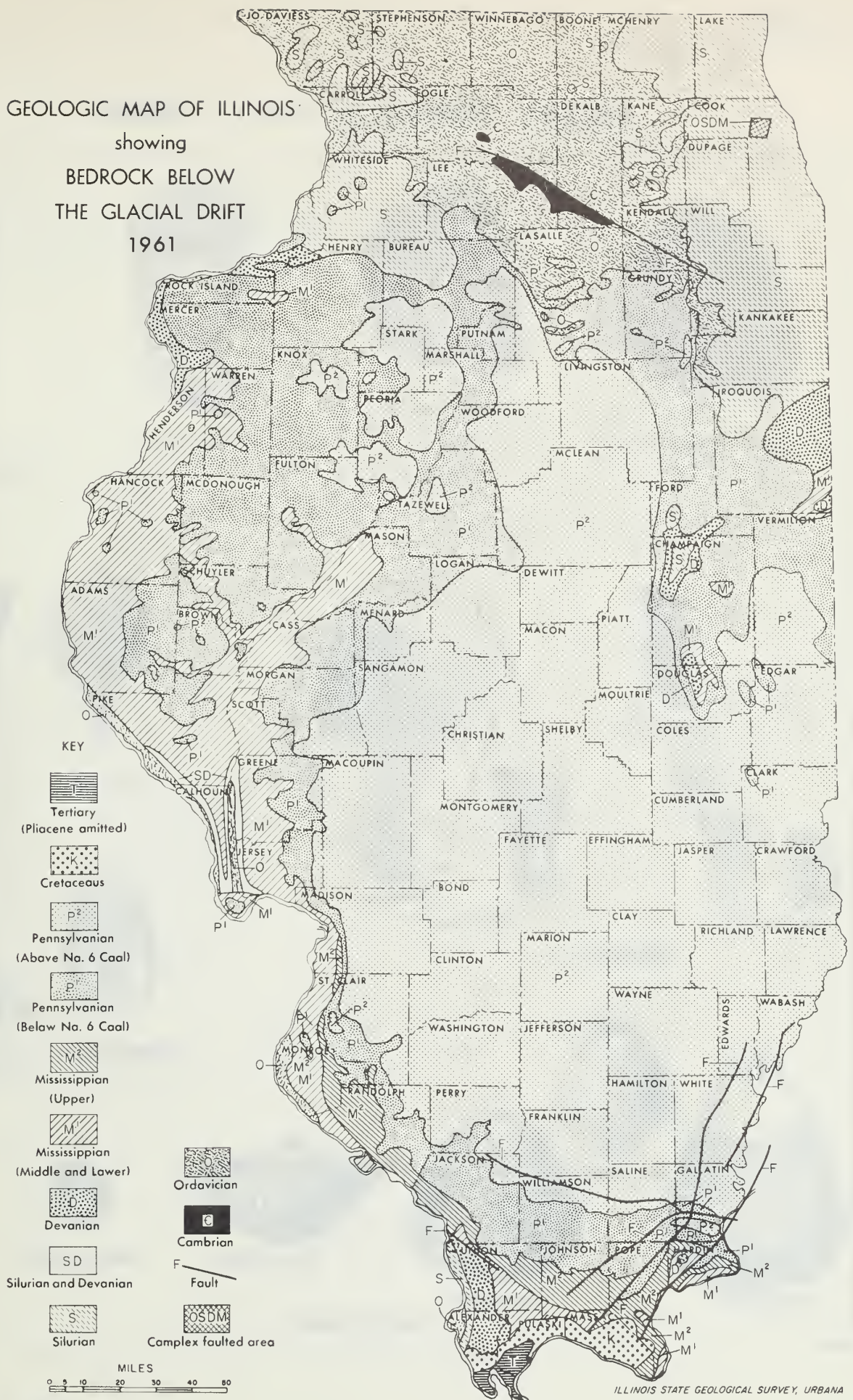


AN IDEALLY COMPLETE CYCLOTHEM

(Reprinted from Fig. 42, Bulletin No. 66, Geology and Mineral Resources of the Marseilles, Ottawa, and Streater Quadrangles, by H. B. Willman and J. Norman Payne)



GEOLOGIC MAP OF ILLINOIS
showing
BEDROCK BELOW
THE GLACIAL DRIFT
1961



COMMON TYPES of ILLINOIS FOSSILS



GRAPTOLITE



Cup coral



Lithostrotion



Honeycomb coral

CORALS



CRINOID



CYSTOID



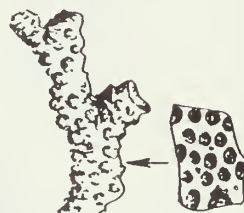
PENTREMITE



Fenestella



Archimedes



Branching

BRYOZOA



Lingula



Orbiculoidea



Spiriferoid



Productoid



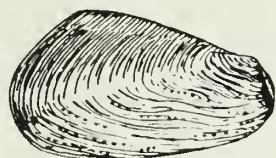
Composita



Pentameroid

BRACHIOPODS

COMMON TYPES of ILLINOIS FOSSILS



"Clam"



"Scallop"

PELECYPODS



High - spired



Low - spired

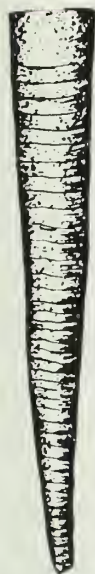


Flat - spired

GASTROPODS



Curved cone



Straight cone

CEPHALOPODS



Coiled cone
(Nautilus)



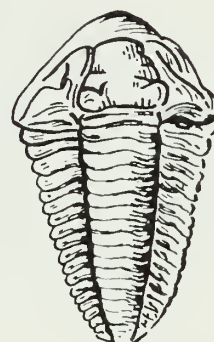
Bumastus



Calymene
(coiled)



OSTRACODS
(greatly enlarged)



Calymene
(flat)

TRILOBITES



